

Application No. 10/552,410
Paper Dated: September 19, 2008
In Reply to USPTO Correspondence of May 20, 2008
Attorney Docket No. 1217-052834

AMENDMENTS TO THE DRAWINGS

The attached drawing sheet includes changes to Fig. 8. The added labels have been circled on the Annotated Sheet. A Replacement Sheet reflecting the current amendment will be provided pending approval by the Examiner and upon allowance of the current application.

Attachment: Annotated Sheets (1)

REMARKS

Claims 1-27 are pending in the application. Claims 1-7, 12, 14-21 and 27 are withdrawn from consideration pursuant to a previously imposed restriction requirement and subsequent election of claims 8-11, 13 and 22-26. Applicant respectfully requests reconsideration in light of the amendments made herein taken with the following remarks. Claim 8 has been amended by way of this Amendment. Accordingly, claims 8-11, 13 and 22-26 are currently pending for purposes of examination, and claim 8 is in independent form. Support for the amendments can be found, for example, in Figs. 7 and 8 and page 21, line 8 to page 24, line 7 of the Specification. Applicant respectfully submits that no new matter has been presented by way of the Amendment.

Objection to the Drawings:

The drawings have been objected to under 37 C.F.R. §1.83(a) for failing to show every feature of the invention specified in the claims. Specifically, the claimed mechanisms for moving the fixing roll and the sticking roll must be shown.

Figure 8 has been amended to depict a mechanism for moving the fixing roll (denoted by reference number 220) and a mechanism for moving the sticking roll (denoted by reference number 240) in accordance with claim 8. Changes to Fig. 8 are indicated by circles on the Annotated Sheet attached hereto. Applicant will provide a Replacement Sheet reflecting these changes pending approval by the Examiner and upon allowance of the current application.

Please note that the mechanism for moving the fixing roll (220) and the mechanism for moving the sticking roll (240) are represented by graphical representations, as opposed to detailed depictions. Applicant respectfully submits that such representations are proper under 37 C.F.R. §1.83(a) when the features are conventional in nature and not necessary for a proper understanding of the invention. Applicant respectfully submits that one of ordinary skill in the art could form a proper understanding of the current invention from the graphical representations (i.e., blocks) shown in the Fig. 8, and as such, the depiction of certain claimed elements (mechanism for moving the fixing roll and the sticking roll) in the drawings by graphical representations is proper, and further detail need not be shown.

Rejections under 35 U.S.C. §103(a):

Claims 8-10, 13, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,328,546 to Brady et al. (hereinafter "Brady") in view of U.S. Patent No. 6,803,320 to Yamamoto (hereinafter "Yamamoto") and U.S. Patent No. 6,715,524 to Chen et al. (hereinafter "Chen"). Claims 11, 22, 23 and 26 stand rejected under 35 U.S.C. §103(a) as being obvious over Brady in view of Yamamoto and Chen and in further view of U.S. Patent No. 6,080,263 to Saito et al. (hereinafter "Saito"). Reconsideration and withdrawal of these rejections in view of the foregoing amendments and following remarks are respectfully requested.

The present invention relates to a method and apparatus for sticking a tape to an adherend, such as a semiconductor wafer. More particularly, the invention relates to a method and apparatus capable of preventing the warpage of an adherend, such as a thin semiconductor wafer, to which a protective tape has been stuck.

Specifically, pre-cut protective tapes 12 are attached to a long support film 10, and the support film 10 is attached to frame member 18 at positions where the pre-cut protective tape 12 to be stuck to an adherend (wafer) 14 is positioned within the frame member 18. The support film 10 is pressed to stick the pre-cut protective tape 12 to the adherend (wafer) 14, and the support film 10 is released from the tape 12. The long support film 10 is under tension, but this tension is decreased with respect to the pre-cut, spaced-apart protective tapes 12 when the support film 10 is attached to the frame member 18.

Accordingly, the pre-cut protective tape 12 stuck to the adherend has reduced residual stress, and the adherend, such as a thin semiconductor wafer to which the tape 12 has been stuck, is free from warpage, which would otherwise be caused by a protective tape applied under tension.

Additionally, the protective tape 12 is pre-cut to approximately the shape of the adherend (wafer). Therefore, the pre-cutting prevents the cutter from damaging the outer peripheral edge of the wafer, which is a problem in the prior art.

Brady discloses a photo resist film application mechanism for applying a layer of dry film resist (18) to a semiconductor wafer (72). In particular, Brady discloses a tape transport assembly (44) at one point being positioned over a laminating assembly (71). A semiconductor wafer (72) is positioned within a heated vacuum chuck assembly (74). A pre-

cut portion of laminate (14), disposed on a transport tape (40), is then applied to the wafer (72) by a lamination roller (46), which presses the laminate (14) onto the wafer (72). Please note Figures 1A-B, 2D and 5, and column 5, lines 3-39 of Brady.

Yamamoto discloses a protective tape separating apparatus (15). The apparatus (15) comprises a chuck table (19). A wafer (W) having two layers of protective tape (T1, T3) applied thereto is positioned on the chuck table (19) within a mount frame (F). Mount frame (F) includes an adhesive tape (Tn) that the wafer (W) is secured to and a ring frame (f) surrounding the wafer. Mount frame (F) operates to secure the wafer (W) in position on the chuck table (19), as the top layer of protective tape (T3) is separated from the inner layer (T1) and the wafer (W). Separating tape (Ts) passes through a separating mechanism (20) and adheres to the top layer of protective tape (T3) so as to peel the protective tape (T3) from the wafer (W). Separating mechanism (20) traverses across the ring frame (f) in order to apply the separating tape (Ts) across the length of the wafer (W). Please note Figures 6-9 and column 6, line 13-column 7, line 40 of Yamamoto.

Chen discloses a laminating system for applying a dry resist layer (3) to a substrate (36). In particular, Chen discloses a laminating head (24) that traverses across the length of the substrate (36) in order to apply a strip of laminate tape (1) having a support film (4) disposed over a layer of dry resist material (3) to the surface of the substrate (36) by pressing the laminate tape (1) on to the substrate (36). Please note Figure 4, column 5, lines 1-23 and column 6, lines 2-11 of Chen.

Saito discloses an apparatus for applying a protecting film to a semiconductor wafer wherein a press roller (107) is used to apply the protective film (109) to the wafer (W) disposed on a mounting table (201). The mounting table (201) is movable to align the position of the wafer (W) with respect to the press roller (107) and the rest of the apparatus. Please note Figures 1-8 and column 3, line 1 to column 7, line 28 of Saito.

Claim 8, as amended, recites, *inter alia*, specific claim language as to “a movable fixing roll for attaching and fixing a long support film to the frame member, the fixing roll having a width greater than the interior width of said frame member such that said fixing roll does not fit within the interior perimeter of said frame member . . .; and a movable sticking roll for sticking the pre-cut protective tape to the adherend, the sticking roll having a width less than the interior width of said frame member such that said sticking roll fits within the interior perimeter of said frame member.” Applicant respectfully submits that Brady,

Yamamoto, Chen, and Saito, taken separately or combined, fail to teach or suggest the above-mentioned claimed subject matter.

As acknowledged by the Examiner, Brady fails to teach or suggest a frame member having an interior perimeter surrounding the adherend. Applicant further submits that Chen and Saito also fail to teach or suggest such a frame member. Rather, Yamamoto is relied upon for the teaching of a ring frame (F) provided in an apparatus (15) for separating protective tape from semiconductor wafers (W). The ring frame (F) is mounted on a chuck table (19) by a suction device and has an adjustable position on the chuck table (19). A semiconductor wafer (W) having plural tape layers (T1, T3) is positioned within the ring frame (F). The chuck table (19) is then moved such that the outer tape layer (T3), which is shown to be level with the top of the ring frame (F), comes into contact with the separator roller (21) of a separating mechanism (20). The chuck table (19) is then moved in the running direction of the separating tape (Ts), such that the outer tape layer (T3) is peeled away from the wafer (W). The position of the frame (F) is then adjusted and rotated so that the inner tape layer (T1) is peeled away in a direction corresponding to the patterned cross-recesses in the wafer (W). The process is then repeated for removing the inner tape layer (T1) from the wafer (W). Please note Figs. 6-9 and column 6, line 13-column 7, line 40 of Yamamoto.

Yamamoto is silent as to the relationship between the width of the separator roller (21) and an interior width of the ring frame (F). It appears from Figs. 6-9 of Yamamoto that the separator roller (21) moves across the top of the ring frame (F) as it separates the outer tape layer, and as such, would have a width greater than the interior width of the ring frame (F). At best, Yamamoto teaches that the separator roller (21) has a width greater than the width of the ring frame (F), but less than some other dimension of the ring frame (F), such as the length so that the roller (21) fits within the frame (F) during the second pass to remove the inner tape layer (T1). It is also possible, however, that the ring frame (F) is vertically adjusted with respect to the chuck table (19) by compression of the adhesive tape (Tn) so that the top of the inner tape layer (T1) and the ring frame (F) align during second and subsequent separating procedures. It is also possible that the ring frame (F) is circular, and thus does not have differing lengths and widths. As such, Yamamoto fails to teach or suggest a roller having a width less than the interior width of the ring frame (F) such that the roller fits within the interior perimeter of the frame. Moreover, as noted above, Brady, Chen, and Saito all fail

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to teach or suggest a frame, and thus cannot be relied upon to provide the necessary teaching or suggestion for providing a fixing roll having a width greater than the interior width of a frame, and a sticking roll having a width less than the interior width of a frame. Further rejection on these grounds would therefore be improper.

Applicant submits that claim 8 is allowable as the prior art of record, including Brady, Yamamoto, Chen, and Saito fails to teach or suggest all of the claimed subject matter. Applicant respectfully requests that the rejection of claim 8 be withdrawn.

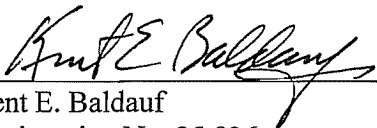
Claims 9-11, 13 and 22-26 are dependent upon and add further limitations to independent claim 8 and are allowable for at least the same reasons as claim 8. Applicant respectfully requests that the rejections of these claims be withdrawn.

Conclusion:

For the foregoing reasons, the Examiner's reconsideration and favorable action regarding claims 8-11, 13 and 22-26 are respectfully requested.

Respectfully submitted,
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